Maryland Cool-Season 2007 Forage Trial Report

SUMMARY

Maryland farmers can benefit from a greater knowledge of cool-season grass variety and grass/legume mix performance in Maryland growing conditions. This valuable information enables farmers to make more informed decisions for maximizing production in a sustainable manner that will conserve natural resources and benefit their bottom line.

Forage variety trials are being conducted by the NRCS and University of Maryland to provide the latest information on agronomic performance of cool-season grass varieties and grass/legume mixes. Two trials are being conducted; one trial to evaluate grass varieties and the other to evaluate grass/legume mixes. This report summarizes data collected from the trials that will be of mutual benefit to the farmers of Maryland and surrounding states, the seed industry, the Maryland Cooperative Extension and NRCS.

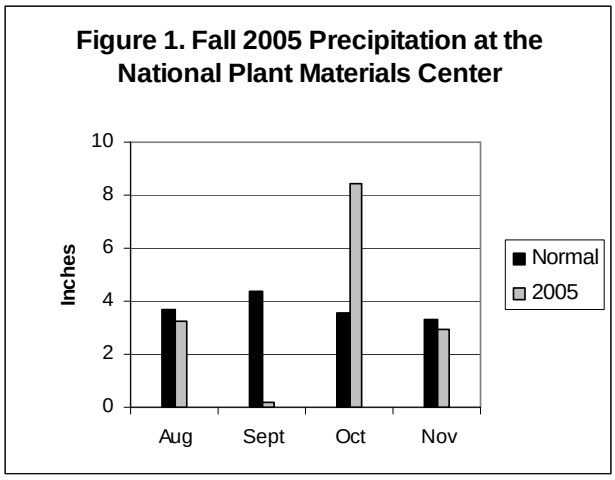
The cool-season forage variety trials were seeded September 25, 2005 at the USDA Natural Resources Conservation Service (NRCS) National Plant Materials Center located on the Beltsville Agricultural Research Center at Beltsville, Maryland.

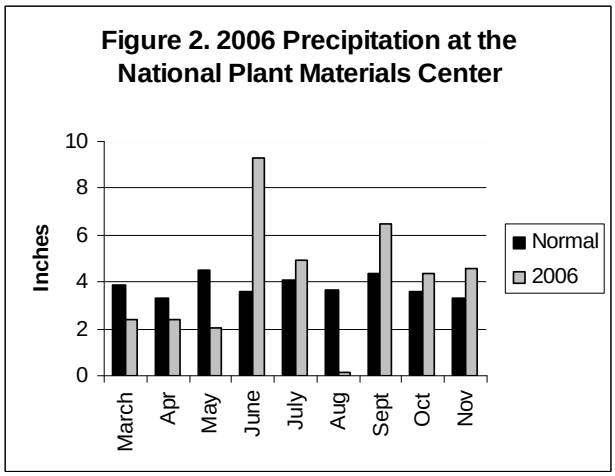
Experimental Design and Conduct

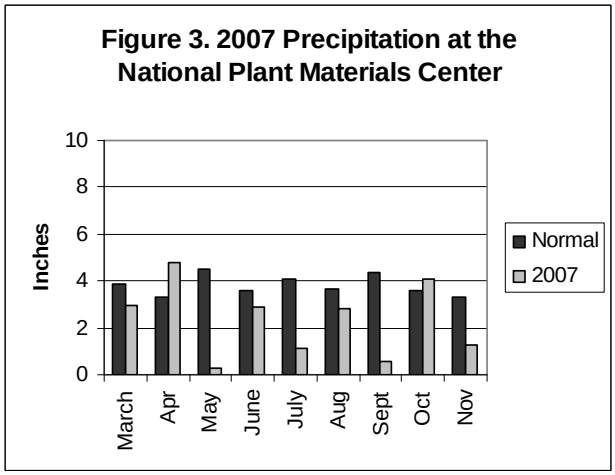
The trial was planted in a randomized complete block with four replications. Plot size is 3 ft. × 20 ft. with yield measurements taken from the entire plot area. Stand ratings were recorded to capture information for establishment and persistence. The trial will continue for a minimum of four years (stands permitting) as a simulated grazing system. Cuttings were made using a Carter flail-type harvester and cut to a height of 3 inches when the grasses achieved a target height of 10-12 inches. Establishment was severely limited by drought in the fall of 2005 and spring of 2006. The first significant rainfall after seeding did not occur until the 7th and 8th of October. Supplemental irrigation was applied as needed to maintain good survival, but was not sufficient for optimal growth. Nitrogen was applied at a rate of 60 pounds of available nitrogen in April, after the first harvest and in the fall. The first cutting was made at the mid to late boot stage to allow for better establishment due to the drought conditions. Subsequent harvests were made after 10-12 inches of height was achieved.

Weather

The precipitation amounts by monthly total for the trial period growing seasons are reported in Figures 1 through 3. In the 2007 growing season there was overall below average precipitation and extremely low precipitation in the months of May, July and September. The droughty conditions were a significant factor influencing yield in the 2007 season.







Interpreting Data and Stand Scores

Summary of yields and stand scores are reported in Table 2 and 4. Varieties are grouped according to species/type and are ranked according to yield performance for this year.

The stand score provides a useful measure of persistence. The stand score is a visual estimate of groundcover that is contributed by the planted variety. The stand score scale is from 1 to 100 with 1 equaling no plants of the seeded species/variety present and 100 equaling complete cover of plants of the seeded variety.

Data presented in Table 2 for cool-season varieties and in Table 4 for mixes can be used to evaluate relative performance in 2007. Comparisons can be statistically evaluated by using the LSD (Least Significant Difference). The LSD value represents the amount of yield which varieties must differ by in order to determine whether the difference between varieties could have happened by chance alone. The value for coefficient of variation (CV) is a measure of the relative variation. In forage trials the CV for yield is typically between 5 and 15 percent. Uncontrollable or immeasurable variations in soil type, soil fertility, soil moisture and environmental factors contribute to increased CV values. Soil type and moisture variations

within the plot area of this trial were undoubtedly major contributors to the increased CV values of this trial.

COOL-SEASON GRASS VARIETY TRIAL

Seed dealers and distributors and grass breeders were invited to submit entries of released varieties or advanced breeding lines that they would like evaluated in Maryland. The seed marketers that contributed varieties are listed in Table 1.

Table 1. Forage Grass Marketers with reported entries.

Allied Seed 1108 Hilldale Dr Macon, MO 63552 (800) 880-8127	**FFR Cooperative** 4846 East 450 North Lafeyette, IN 47905 (765) 589-3123
Barenbrug USA 33477 Hwy. 99E P.O. Box 239 Tangent, OR 97389 (541)-926-5801	**Pennington Seed Co.** P.O. Box 290 Madison, GA 30650 Phone: (800) 285-7333
DLF-International Seeds 175 West H Street P.O. Box 229 Halsey, OR 97348 Phone: (541) 369-2251	**Southern States Cooperative** P.O. Box 26234 Richmond, VA 23260 Phone: (804) 281-1253

The eighteen cool-season grass entries in this trial are varieties of tall fescue, orchardgrass, Alaska brome, pasture brome, festulolium, and perennial ryegrass (Table 2). Varieties that did not persist with a minimum of 50% stand were not included in the data analyses. The varieties that did not persist were ‘Hakari’ Alaska brome, ‘Bareno’ pasture brome, ‘Athos’ orchardgrass, ‘Barexcel’ orchardgrass, and ‘Grandaddy’ perennial ryegrass. The trial included advanced experimental entries to be evaluated for possible future releases as named commercial varieties. Replication 1 of the variety trial was eliminated from the data analysis because of severe stand mortality of many of the entries due to variations in the soils that amplified the effects of the drought.

Table 2. Yield comparison of cool season forage cultivars by harvest date and season total at the USDA-NRCS National Plant Materials Center, Beltsville, Maryland, 2007.

		Forage Yield (lb/acre)					Stand
Species/Variety	Marketer	May 4 or 9	May 23	June 22	Nov 29	Season Total	4/23/07 (%)
Tall Fescue							
BAR FA 6FRD	Barenbrug USA	*1059	777	940	822	3598	80.0
BAR FA 9301A	Barenbrug USA	*1035	724	1333	683	3775	84.2
BAR FA BTR9	Barenbrug USA	1096	595	857	906	3454	77.5
Enhance	Allied Seed	*706	509	1493	827	3535	85.8
Kora	DLF-Intl. Seeds	*907	1002	1160	595	3664	85.0
Select	FFR Cooperative	*850	734	975	670	3229	82.5
Max-Q		*751	765	1048	591	3155	85.0
KY-31	Public	*725	627	1227	867	3446	95.0
Orchardgrass							
Benchmark plus	FFR Cooperative	*624	656	1295	272	2847	80.0
Extend	Allied Seed	*576	762	980	265	2583	70.8
Intensive	Barenbrug USA	497	455	987	nh[1/]	1939	61.7
Festulolium							
Perun	DLF-Intl. Seeds	1023	561	1480	nh	3064	70.0
Duo		568	510	1213	252	2543	58.3
Perennial ryegrass							
Remington	Barenbrug USA	364	660	1487	158	2669	86.7
Mean		769	666	1176	576	2996	78.8
LSD[2/] (0.05)		347	NS[4/]	NS	408	351	20
% CV[3/]		26	27	26	41	22	15

1/ = not harvested; 2/ = least significant difference test at 5% level of probability; 3/ = coefficient of variation; 4/ = not significant

*The entries with the earliest growth that were cut on May 4 are indicated with an *. The remaining entries were cut on May 9.

COOL-SEASON GRASS AND LEGUME MIXES TRIAL

Local commercially available varieties of cool-season grasses and legumes were used to formulate the mixes in the study. Twelve mixes are included in this study, including 10 custom mixes, and two commercial mixes. Table 3 lists the ratio of components in each of the mixes.

Table 3. Cool-Season Grass and Legume Mixes

Mix	Common Name	lbs/acre
1	tall fescue (Max-Q)	15
	KY bluegrass	4
	red clover	8
	ladino clover	1

Mix	Common Name	lbs/acre
2	tall fescue (Max-Q)	15
	red clover	8
	ladino clover	1
3	tall fescue	15
	red clover	8
4	tall fescue (Max-Q)	15
	white clover	1
5	orchardgrass	12
	KY bluegrass	4
	red clover	8
	ladino clover	1
6	orchardgrass	12
	KY bluegrass	4
	red clover	8
7	orchardgrass	12
	KY bluegrass	4
	ladino clover	1
8	orchardgrass	12
	KY bluegrass	4
9	orchardgrass	12
	red clover	8
10	orchardgrass	12
	ladino clover	1
11	KY bluegrass	8.8
Southern States	perennial rye	4.4
'Horse Mix'	orchardgrass	4.2
	timothy	2.2
	ladino clover	1.1
12	orchardgrass	9.5
Southern States	tall fescue	7.7
'Renovator Mix'	timothy	3.3
	alfalfa	1.1

The mixes tested all had good overall stands of greater than 90% at the first cutting. Therefore stand ratings were not recorded for individual plots. Yield data for the 4 harvests in 2007 and the season total are shown in table 4. The yield data for the mixes suggests that tall fescue had the most significant influence on yields. The 5 mixes that included tall fescue had the highest yields and the mixes that did not contain tall fescue had similarly low yields. This could be due to the greater heat and drought tolerance of tall fescue. The Nov 29 harvest data shows the greatest difference between mixes with tall fescue and without tall fescue. This indicates that tall fescue was able to withstand and recover from the heat and drought of the preceding summer, and that the other species in the mixes had been likely severely stressed or killed.

Table 4. Yield comparison of cool season grass and legume mixes by harvest date and season total at the USDA-NRCS National Plant Materials Center, Beltsville, Maryland, 2007.

	Forage Yield (lb/acre)				
Mix	**May 9**	**May 30**	**June 3**	**Nov 29**	**Season Total**
12	2120	835	606	1201	4761
3	1891	746	640	1170	4447
1	1800	834	652	1121	4406
2	1738	737	664	1245	4384
4	1528	780	658	1289	4254
10	1339	866	534	661	3400
9	1265	782	496	621	3164
5	1201	761	557	636	3154
8	1091	772	569	568	2999
6	1162	791	469	566	2988
7	1179	702	528	537	2946
11	1063	903	508	412	2886
Mean	1448	792	573	835	3649
LSD[1/] (0.05)	485	NS[3/]	NS	363	949
% CV[2/]	23	20	19	30	18

1/ = least significant difference test at 5% level of probability; 2/ = coefficient of variation; 3/ = not significant

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Visit the Plant Materials Program or NRCS websites to learn more about using plants to address conservation problems.
http://Plant-Materials.nrcs.usda.gov
http://www.nrcs.usda.gov

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